NRC-Mitacs Internship Identification Form

- The National Program Office (NPO) has a contribution arrangement for the NRC's collaborators to leverage Mitacs funding for internships. Two types of internships are available:
  - Accelerate: placing university students in Canadian firms or non-profit organizations
  - Globalink: placing RWTH Aachen University (Germany) students in Canadian universities
- Eligible internships must support projects that are part of a challenge / supercluster support program. New projects will require a collaborative research agreement before Mitacs can provide internship funding.
- Please fill and submit the form to challenge / supercluster support program director for signatures, as a pre-requisite to a Mitacs internship application.

NRC principal investigator	Academic principal investigator	Tracking number (provided by NPO)
Mark Salomons	Prof. Ben Britton	**GBL-017**

Internship type	Internship level and length Accelerate: Level of intern(s) (Master, PhD, PDF) and number of internship units (IU) for each intern Globalink: Level of intern (Master, PhD) and length of internship (in weeks or months)	Internship host organization Accelerate: Firm / non-profit organization Globalink: Canadian university
Globalink	PhD, ~~12 months~~ 6 months	University of British Columbia, Department of Materials Engineering

Home university of academic collaborator Accelerate: Canadian university (if known) Globalink: RWTH Aachen University
RWTH Aachen University

Name of challenge / supercluster support program	Title of collaborative project
Advanced Manufacturing	Implementation of HR-EBSD and ECCI for advanced microstructure analyses on the Nanoscale 2.0

Project description. Provide a short description including role of host and collaborator (150 words maximum)

The student will build on experience and results of previous internship GBL-009. This project will include a different material focus.

In this project, the new and advanced method of High Resolution Electron Backscatter Diffraction (HR-EBSD) should be established at the University of British Columbia (UBC). Moreover, the limits of these method in terms of resolution should be tested and advanced. The results will be crosschecked by means of Transmission Electron Microscopy (TEM) at the NRC Nano-technology lab in Alberta. HR-EBSD can be used to understand deformation processes better and to visualize defect structures in various materials (metals, minerals and ceramics). In addition the advantages of direct electron detectors in terms of image quality and distinctness of phases shell be tested.

For this project, we will develop the approach to look at Mg-Al-Ca alloys, which can be used as a lightweight construction material at elevated temperature, such as in combustion engine parts. Understanding co-deformation behaviour between hard laves phases and soft Mg matrix is crucial in this material, to precisely tailor the optimal microstructure. We want to enhance our understanding on the orientation relationships in those phases, as well as improve EBSD based phase identification of the Laves phases with very similar crystal structures.

Student profile. List the qualifications and pre-requisites for the intern (Globalink only)

- PhD candidate in materials science, physics, mechanical engineering or in a closely related area
- Experience with electron microscopy, EBSD, microstructure analysis, nanomechanics
- Programming experience (Python and Matlab)

- Work independently, self-motivated, with a strong work ethic and collaborative skills
- Good written and oral English language skills

Does the collaborative project involves NPO G&C funding?	No	If yes, provide NRC agreement number	
Is a CRA in place with the Canadian collaborator(s)?	Choose an item.	If yes, provide NRC agreement number	

How will the internship advance the challenge / supercluster program objectives? (150 words maximum)

The internship will advance the challenge program of Advanced Manufacturing through the closely connected sister program of Clean and Energy Efficient Transportation. Mg-Al-Ca alloys can be used as lightweight construction material at elevated temperatures for various systems such as combustion engine parts, allowing for more efficient energy generation.

Signé numériquement par Despres, Melissa DN : cn=Despres, Melissa, c=CA, o=GC, ou=NRC-CNRC, email=melissa.despres@canada.ca Raison : J'approuve ce document Date : 2023.02.09 12:11:10 -05'00'	Girard, Russell Digitally signed by Girard, Russell Date: 2023.02.13 10:48:14 -05'00'
Program Director signature	Challenge Officer signature